

and integration, and (3) keeping the industry contestable.<sup>17</sup> The number of firms in the MSP industry should *not* be an artifact of well-meaning but ill-advised public policy that seeks competition in “many” competitors but ignores whether that particular form of competition can ever be efficient and welfare-maximizing given the rather unique characteristics of the MSP industry. This point was stressed unequivocally by Professor Alfred Kahn at a recent hearing:

“There is nothing unfair about an advantage that is an efficiency advantage. We want, in competition, people who have advantages of efficiency that may arise from combining the provision of different services for economies of scope, to be able to exercise them in the market ...

“Competition means let your economies of scope compete with my economies of scope, and don’t hamstring mine as compared to yours ..., ... what your question seems to imply is that we should somehow protect people who are less efficient in providing services, in the name of preserving competition. I would regard that as suppressing competition under the false banner of preserving competition.”<sup>18</sup>

It is important to let free market forces, not regulation, determine how the potentially enormous MSP industry should deal with issues like economic efficiency and viability. The role of enlightened public policy should be merely to ensure that the industry stays contestable, not to interfere with its inner dynamics.

### *C. Second Public Policy Principle: Use Safeguards That Ensure Contestability*

Unlike the extensive past regulation of telephone companies (particularly LECs) on the natural monopoly or public utility model, the role of regulation in the MSP industry should be far more restrained. For example, the adoption of incentive and price cap regulation, use of non-structural safeguards, and even targeted deregulation in the telephone industry in recent years

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<sup>17</sup>The concept of “contestability” is, in many ways, a more practical standard for competition than the textbook notion of “perfect competition” itself. It achieves the beneficial *results* of competition without placing the onerous requirements on firm size and industry composition called for by the perfect competition standard. For an MSP industry in which financial viability will likely mean “competition among the few,” especially in local or regional markets, contestability is a more realistic goal for public policy design. See the Appendix for details on the contestability standard.

<sup>18</sup>Testimony of Alfred E. Kahn, Canadian Radio-television and Telecommunications Commission, Public Notice 92-78, Transcript, v. 3, at 537-538.

show that departures from the heavily-regulated public utility model are possible, desirable, and indeed, inevitable.

If the MSP industry truly develops as envisioned, it will not have a feature currently often attributed to LECs and cable companies in their respective industries: the bottleneck facilities associated with local or regional monopoly operations. Early in the formation of this industry, each MSP (irrespective of its origin as an LEC, cable company, or some other entity) will very likely have its own network capable of providing both narrow- and broadband services. There will, therefore, be little opportunity for an MSP to appropriate the kinds of economic rents and competitive advantages usually associated with control of bottleneck or essential facilities.

The telephone part of an MSP's operations will most likely resemble the operations of LECs today. The notable exception, of course, will be that, in the MSP industry under two-wire competition, telephone dialtone access could not be characterized as a bottleneck service. Two-wire competition, augmented perhaps by simple interconnection access rules, will keep the market for the transport of telephone services contestable.

There are two possibilities on the video side of an MSP's operations. Either MSPs may provide strictly common carrier VDT platforms that carry video programming on behalf of other parties or they may use their facilities to deliver their own video programming like today's cable companies without a common carrier undertaking to carry programming for others. In the former case, the availability of at least two common carrier providers of VDT access and transport will mean that there cannot be any bottleneck facilities. Contestability in that video transport market can be doubly ensured by requiring interconnection access, in accordance with common carrier principles, by any video program provider to those MSPs' facilities. In the latter case, either one or both MSPs may operate as cable operators. Under the present system of cable regulation, cable companies are permitted to select discriminatorily the programming package they wish to transport. While this allows those operators to function according to their feasible business interests, regulation does protect those non-affiliated or non-selected programmers who otherwise have no means of their own to bring their programming to the viewing public. Since it may be prohibitively expensive for such programmers generally to build their own video transport facilities, current cable regulation sets aside a certain fraction of channel capacity for them to lease. Current cable regulation also restricts the amount of video programming in which

a cable operator may have a cognizable interest (“vertical ownership limit”). Thus, common carriage is *not* the only way to address concerns related to limited access by video programmers when the MSPs in the market are cable operators only.

All this implies that for ensuring contestability, public policy has no need to reinvent the wheel; some tried-and-tested regulatory instruments will suffice. Contestability does *not* require that firms be “small” or somehow equal in size and scope. Hence, public policy should not be geared to merely finding inventive ways to diminish the market shares of current LECs. First of all, “small” market share is not necessary for contestability; it may not even be sufficient. Second, the market shares in question will depend upon the product scope of the full MSP industry, not just the telephone-only industry that LECs currently operate in. Since LECs are not likely to be the only participants in the MSP industry, even in its start-up phase, it is not at all certain *a priori* that they would be in a position to somehow dominate or “control” that industry.

Contestability *does*, however, require that barriers to entry into and exit from the industry be low or non-existent. Often, the most significant form of entry barrier is the high sunk cost associated with production and distribution facilities. Imposing a franchise “buildout” requirement on LEC-MSPs that wish to provide cable service may well constitute such an entry barrier if the capacity added under the buildout requirement exceeds that needed to serve existing consumer demand. Any such buildout requirement will place an untenable “universal service”-like obligation on new LEC-MSPs seeking entry.

Contestability has two important requirements. First, as discussed above, it requires that competitors to LECs be able to enter and/or exit the MSP industry easily and inexpensively. The second requirement is that incumbent firms should not be able to conduct pricing strategies that can seriously harm entrants.<sup>19</sup> Most often, this means that incumbent firms should be prevented from setting either predatory prices (that prevent entry) or retaliatory prices (that punish entry). Since both such anticompetitive pricing strategies depend on cross-subsidization, the focus of public policy should be to eliminate such cross-subsidization.

Public policy for preventing cross-subsidization runs the gamut from structural separation

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<sup>19</sup>These requirements are stated by Baumol et al. (1988) at 360. See W.J. Baumol, J.C. Panzar, and R.D. Willig, *Contestable Markets and the Theory of Industry Structure*, rev. edn., Orlando: Harcourt Brace Jovanovich, 1988.

to relatively nonintrusive cross-subsidy tests. Conceptually, the simplest way to prevent cross-subsidization among an MSP's many services is to require that each service earns enough revenue to cover at least its own incremental cost.<sup>20</sup> Now, as seen before, economies of scope arise either from cost complementarities or from the sharing of certain costs across multiple services. The numerical example in the Appendix shows how the *direct* or service-specific incremental cost is reduced in the presence of shared costs (or economies of scope). This is an important point that public policy must recognize: it means that the incremental cost test for prevention of cross-subsidy must apply to the incremental costs under joint production when scope economies are present, *not* the incremental costs that would arise under stand-alone production of the services.<sup>21</sup>

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<sup>20</sup>See Baumol and Sidak (1994, esp Ch 5) for a detailed discussion of cross-subsidy tests. Variants of their tests have been proposed and adopted in telephone regulation at various levels. W.J. Baumol and J.G. Sidak, *Toward Competition in Local Telephony*, Cambridge, MA: MIT Press, and Washington, DC: American Enterprise Institute for Public Policy Research, 1994.

<sup>21</sup>This fact draws attention to the root of the cross-subsidy problem. When a firm uses common facilities or resources to produce multiple services, some more competitive and others less so, it may be difficult to disentangle the *true* direct incremental cost of one service from that of another. In the process, if the less competitive service is assessed an incremental cost that is above the true level and the more competitive service is assessed an incremental cost that is below the true level, the former service may have too high a price floor and the latter service too low a price floor. Consumers of the less competitive service may then end up cross-subsidizing consumers of the more competitive service. This is clearly cross-subsidization *even though*, on the face of it, both services appear to be generating revenues that cover their *assessed* incremental costs. For the incremental cost/price floor test for cross-subsidy to work as desired, the incremental costs themselves must be properly measured.

The FCC's joint (accounting) cost rules are used to test for cross-subsidy at the level of revenue requirements. Levin and Meisel (*infra*, note 45) assert that such allocation-based rules that are meant to guard against cross-subsidization of unregulated by regulated services are also often biased intentionally in the opposite direction. That is, these rules tend to allocate a disproportionately larger share of cost to unregulated or competitive services than to regulated services. In addition, Levin and Meisel claim:

"... cost allocation rules also often attempt to capture most or all of any *economies of scope* for the customers of *regulated* services. Non-regulated services will be assigned stand-alone costs, with any cost reductions from economies of scope benefiting mainly or exclusively the customers of regulated services, even if the economies of scope result from the addition of a new, non-regulated service." [p 470, emphasis added]

In principle, the services that give rise to economies of scope should also all share in the benefits (lowered service-specific incremental cost for each). But, by assigning those benefits to regulated services only, regulators do more than is necessary for preventing cross-subsidization.

The “big picture” issue is, of course, that approaches to preventing cross-subsidization need not be draconian. For example, a “separate subsidiaries” requirement is frequently considered essential to such prevention.<sup>22</sup> In fact, wherever economies of scope are involved, the FCC has lately shown a disinclination to use structural separation as a regulatory tool.<sup>23</sup> First, the separate subsidiaries requirement does nothing whatsoever to help identify the true incremental costs of the various services which is, after all, what a public policy seeking to prevent cross-subsidies must first do.<sup>24</sup> Second, the separate subsidiaries requirement only has meaning when the services in question would otherwise be produced using common or shared facilities (e.g., *transport* of telephone and video signals). Such a requirement has no *economic* meaning when the services, even though produced or assembled “under one roof,” use distinct resources and facilities (e.g., transmission and switching services *vs.* video or “content” programming). Here the possibility of cross-subsidization is minimized because the service-specific incremental costs are more likely to be measured accurately and the shared costs, such as they are, are likely to be lower.

The most benign, yet effective, form of public policy that guards against cross-subsidization is incentive or price cap regulation. By reducing significantly both the *incentive* and the *ability* to cross-subsidize one set of services by another, such regulation can be effective for promoting overall contestability in the MSP industry. This would happen regardless of the relative market strength of an MSP in offering telephone or video service.<sup>25</sup> Most important, scope economies that arise from combining telephony and video can be preserved and wasteful duplication of resources and facilities can be avoided.

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<sup>22</sup> For example, in a recent decision, U.S. District Judge Harold H. Greene permitted Bell Atlantic Corporation and Pacific Telesis Group to provide video programming nationwide provided they maintain separate subsidiaries for their telephone and video operations. *The Cable-Telco Report*, March 27, 1995. Congressional legislation introduced in 1993 (S.1086 and H.R.3636) stipulated that LECs be allowed to offer video programming only through a separate subsidiary or programming affiliate.

<sup>23</sup> *Supra*, note 8, and Notice, ¶¶ 37-39.

<sup>24</sup> See, e.g., Johnson, *supra*, note 7, at 76.

<sup>25</sup> Many observers believe this to be true of price cap regulation that does not constrain the level of the firm’s overall profits. See, e.g., Johnson, *supra*, note 7, at 77-79.

The final and often overlooked source of protection against predation and cross-subsidy in the long run is the competitiveness or contestability of the MSP industry itself. The creation of such an industry will likely promote competition for *both* telephony and video. That itself will make it extremely difficult for an MSP to cross-subsidize its "competitive" services because it will have no "noncompetitive" services with which to sustain any cross-subsidies. Public policy's long run goal ought to be to guide the MSP industry in this direction.

In conclusion, making the MSP industry contestable - despite firms of uneven size - should be a top priority of public policy. Regardless of whether or not the MSP firm operates like a common carrier, simple rules that mitigate entry and exit barriers and price cap regulation with price floor tests (to prevent anticompetitive pricing and cross-subsidies) should be the two prongs of that public policy.

*D. Third Public Policy Principle: Preserve MSP's Right to Choose Its "Mode of Supply"*

Once LECs are permitted to provide video programming over their own networks, they will have to make a very important *business* decision regarding their "mode of supply." While, in all likelihood, an LEC-MSP will continue to offer telephone services on a common carrier basis, its offering of video transport services may be either on a common carrier basis or a non-common carrier basis (like today's cable systems). If it chooses to provide both telephone and video transport services as a common carrier, i.e., by providing access and transport to whoever seeks it, the LEC-MSP is, of course, in the common carrier mode of supply. On the other hand, if it provides telephony as a common carrier but provides video transport, and programming like a cable system, it is in a *mixed* common carrier/non-common carrier mode. Which mode of supply the LEC-MSP elects to be in should, however, be that firm's business and economic decision to make, not an artifact of a predetermined regulatory model or vision.

In its Notice, the FCC has asked the following public policy question: should an LEC-MSP be regulated as a common carrier under Title II of the Communications Act, as a cable operator under Title VI of that Act, or as both? The answer is that whatever regulatory safeguards are adopted must satisfy five criteria:

- (1) They must not be draconian or heavy-handed (since vital business interests and decisions,

indeed *the very viability of two-wire competition*, is involved). The safeguards must be only those needed to foster competition and appropriate for the LEC-MSP's mode of supply. For example, a separate subsidiaries requirement may not be needed for the joint provision of telephony and video.

- (2) The LEC-MSP must first have the freedom to elect whichever mode of supply is in its best business interests subject only to safeguards that are appropriate for that mode of supply. But, in all circumstances, such an election should be a business choice, not one unduly influenced by a form of regulation such as Title II or Title VI.
- (3) Joint provision of telephone and video transport over an integrated network will occur regardless of the chosen mode of supply. That joint use of the network will likely be the *primary* potential source of cross-subsidy. Therefore, cross-subsidy protections must be focused on such joint use and not on the chosen mode of supply *per se*. Such protections may be less important elsewhere in the LEC-MSP's operations, e.g., in the possible vertical integration between video access, transport, and programming.
- (4) While common carrier safeguards are appropriate for the LEC-MSP's telephone operations, no blanket application of either Title II or Title VI regulation should be contemplated for its video operations without paying due attention to the mode of supply elected and specific, narrowly-tailored safeguards made necessary by that choice.
- (5) There must be parity and symmetry in the application of safeguards to all entrants into the MSP industry (regardless of their origin as an LEC, cable company, or some other entity). This should be especially true of MSPs that deploy their own integrated networks since, with at least one other MSP present, none will then have any bottleneck facilities to control and derive economic rents from.

In sum, two-wire competition in the proposed MSP industry requires delicate nurturing. The firms that decide to participate in that industry (and thus make such competition possible) will condition that decision on their business and economic interests. This is because an LEC today has no *public obligation* to provide video services; nor is a cable company obliged to provide telephone service. The principal inducement they need to become MSPs is the freedom to pursue greater opportunities and business profitability. While safeguards to protect consumers may be appropriate, they must be neither hindrances to the development of a competitive MSP industry nor means to impose additional regulatory obligations on today's regulated entities that could be tomorrow's MSPs.

## APPENDIX

### Economies of Scope and Scale, Efficient Industry Structure, and Competition<sup>26</sup>

#### A. Introduction

In this Appendix, we first use economic theory to explore the likely nature and composition of the MSP industry. For this, we explore issues like economies of scope and scale, the determinants of an efficient industry structure (comprised of both single-product and multiproduct firms), causes of multiproduct production, and the concept of market contestability. Following this discussion, we review the empirical record on economies of scope in telecommunications. We place particular focus on the evidence, limited though it may be, that appears to confirm the existence of scope economies in the integrated provision of telephone and video services. Finally, we list a number of empirical studies of economies of scope in telecommunications.

We begin with the following question: Under what conditions can successful “two-wire” competition occur? To answer this question, we have to first explore the *economic* circumstances under which two or more competing facilities will be deployed. It will be seen that efficient competition among multiple facilities-based competitors in the MSP industry is predicated upon two factors: (1) the level of demand for telephone and video services in the relevant “market”, and (2) the economies of scope that arise from joint provision of those services from common or integrated facilities.

The following issues are particularly germane to our exploration:

- (1) The relevant “industry” or market
- (2) Economies of scale and scope
- (3) The efficient (or cost-minimizing) industry structure
- (4) Industry size (number of MSPs) and economic feasibility or viability
- (5) Incentives for multiproduct production as opposed to specialization
- (6) Multiproduct production and competition

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<sup>26</sup>This chapter presents many fundamental results from economic theory. Many of these results and their underlying premises are quite complex and require numerous mathematical concepts and derivations. However, in putting together the essential elements of the “storyline” for present purposes, we rely on intuition and simple examples rather than mathematics. Much of what is presented here can be found in great and even tedious detail in Baumol et al., *supra*, note 22, particularly Chapters 4-6 and 9.

(7) Contestability: a better standard than “perfect competition”

*B. Relevant Industry or Market*

While the term “industry” typically connotes a complete collection of firms that produce a particular product, it is important to be precise about the sense in which it is used here. An industry is frequently defined in economics to include all products that are related either through consumption or production or both (the “product scope”). In that sense, the “telephone industry” refers to all types of telephone service and includes LECs, IXCs, and other types of carriers. The appropriate characterization of that industry changes somewhat when video services - traditionally identified with the broadcasting or cable industries - are included as well. For this reason, in this paper, we have used the agnostic albeit rather nondescript term “MSP industry” to refer to LECs, cable companies, and other entities that aspire to providing telephone and video services, regardless of their current service offerings.

Another definitional characteristic is the “geographic scope” of the industry. Until now, LECs have operated in markets that, depending on the type of telephone service in question, have been labeled as local, short-haul, or regional (interstate). Being barred from offering video services within their “regions,” LECs have pursued alliances with cable systems to offer video services in states outside their regions. Arguably, while an LEC’s telephone or narrowband services are mostly delivered within regional and sub-regional markets, its offerings of in-region and out-of-region video services puts it in a national market for those services.

In this paper, the product scope for defining the MSP industry includes all narrowband (telephone) services and broadband (video transport and programming) services. In principle, the geographic scope should be regional for telephone services but national for video services. However, we simplify the analysis by examining the business decisions that pertain to providing telephone and video services in regional or “local” markets initially.

*C. Economies of Scale and Scope*

Arguably, economies of scope are the central *economic* issue for the proposed MSP industry. These economies lie at the heart of technologically feasible and economically viable two-wire competition. To explore this theme, we first make the following assumptions about an

### LEC-MSP (and MSPs generally):

- (1) It is a *multiproduct* firm, i.e., it provides a variety of distinct services (e.g., telephone subscriber access, telephone transport and switching, voice and data communication services, VDT service, cable service, etc.)
- (2) It is permitted by public policy to offer all of its services over a common or integrated network.
- (3) It uses numerous shared resources (e.g., network components, buildings, marketing channels, billing and collection systems) to provide those services.
- (4) Many, if not all, of these shared resources are fixed costs to the MSP, i.e., they cannot be avoided without the complete cessation of operations.
- (5) Some of the MSP's fixed costs may be service-specific, i.e., fixed costs that can be avoided by ceasing to produce individual services but without requiring that all operations be shut down.

These assumptions imply that the public policy decision to permit LEC-MSPs to offer video programming, not just VDT, along with traditional telephone services has already been made. We next define some technological characteristics of multiproduct firms.

#### Service-specific Economies of Scale:

For simplicity, label the MSP's services as "telephone" and "video." As assumed, the MSP incurs certain fixed costs that are unique to each service (service-specific fixed costs) and other fixed costs that are common to both (shared fixed costs). If the average or unit cost of telephone service declines as the volume of that service provided increases, then that service is said to experience service-specific economies of scale. The same may be said of video service. If a service's unit cost increases as its volume expands, then it is said to experience service-specific diseconomies of scale. These concepts are analogous to the concept of economies or diseconomies of scale that are frequently mentioned in the context of single-product firms.

#### Economies of Scope:

Suppose initially that the MSP industry has two firms, an LEC that only provides telephone service and a cable company that only provides video service. The cost to each firm of providing its single service in isolation is called the *stand-alone cost*. Consider what happens when a single firm can provide both services. That firm is said to experience economies of scope if the total cost of providing the two services together turns out to be lower than the combined stand-alone cost of providing those services separately. Put differently, when there

are economies of scope, joint or integrated provision is cheaper than separate provision.<sup>27</sup> Conversely, there are diseconomies of scope when integrated provision is more expensive than separate provision. In principle, both the LEC and the cable company in our scenario could experience such economies of scope from integrated service provision. We next explore how scope economies may arise.

Baumol et al. (1988) have identified two sources of economies of scope.<sup>28</sup> The first, *cost complementarity*, refers to synergies in the joint production of multiple products. Usually, cost complementarity arises as technological or engineering economies from combining production activities for different products. Baumol et al. explain that this may arise from the use of *public inputs*, i.e., inputs which once acquired to produce one product are available at no additional cost to produce some other product(s).<sup>29</sup> The practical effect of cost complementarity is that the addition of a new product to the line-up reduces the direct incremental cost(s) of the product(s) already being produced. For example, once a broadband network is in place for providing telephone (video) service, it can also be used to provide video (telephone) service at less than the cost of adding new facilities for providing that service.

The second source of economies of scope are fixed inputs and costs that are *shared* by multiple products.<sup>30</sup> These may include buildings, administration, marketing channels and delivery systems, billing and collection, maintenance operations, and other overheads that generally do not depend on the volume of each product produced. By spreading these costs across multiple products produced together, a multiproduct firm can enjoy a cost advantage (lowered incremental cost) that firms that produce those products on a stand-alone basis do not.

Therefore, economies of scope may arise for both technological and other operational reasons. While it is hard to predict precisely what form they will take in the MSP industry, it is reasonable to assume that LEC-MSPs will be able to add video services to its product line at less

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<sup>27</sup>Economies of *scope* arise when a firm diversifies its product base, i.e., its scope, and uses a common production structure for all of its products. They can only arise within a multiproduct firm whereas, in contrast, economies of scale may be available to single-product and multiproduct firms alike.

<sup>28</sup>Baumol et al., *supra*, note 22.

<sup>29</sup>*Id.*, at 76.

<sup>30</sup>*Id.*, at 77.

than the cost of a stand-alone operation and the same will be true for cable companies that add on telephone services. Chapter III reviews some of the preliminary evidence on this.

#### *D. The Efficient Industry Structure*

Industry structure generally refers to the number and size distribution of firms, degree of product differentiation, conditions of entry and exit, etc. Our main concern here will be with the number of firms and size distribution in the MSP industry, and to a lesser extent with entry and exit conditions. First, we explore what an *efficient* MSP industry will be like.

Of the many concepts of economic efficiency used by economists, the one most pertinent here is *technical efficiency*. This concept is key to understanding the impact of public policy or of market forces on the firm's - and industry's - cost and production performance. A firm is said to be technically efficient if it minimizes its cost of producing all of its services. For a single-product firm, this issue is straightforward. For a multiproduct firm, however, economies of scope and service-specific economies of scale together determine the cost-minimizing mix of services and production techniques. Finally, the technically efficient structure of an industry is one in which the number of firms and their production levels are such as to minimize the *combined* total cost of producing all the services in question.

What may be said about the technically efficient structure of an MSP industry in which individual MSPs experience economies of scope? First, economies of scope lead to greater technical efficiency of the firm. Every service produced by the MSP is a beneficiary of the scope economies. It can be shown that when scope economies are present, the sum of the incremental costs of all the services is less than the total joint cost of those services. The difference between the two is the joint or common cost shared by the services. Clearly, the larger is the shared cost component in total joint cost, the smaller are the individual service incremental costs and their sum. Since economic decisions about the supply of the two services depend on their incremental costs, the lower these costs are the more technically efficient will production be and, moreover, the lower the corresponding service price floors can be.<sup>31</sup>

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<sup>31</sup>Of course, while setting the price of a service at or above its incremental cost protects against the danger of cross-subsidy, the MSP will have to also include markups in the service prices with which to pay for its shared costs, i.e., to be financially viable. The economic theory of second-best suggests

Second, if more than one MSP in the industry enjoys economies of scope, there is a magnified industry-wide gain in technical efficiency. Such an industry is technically more efficient than one comprised solely of single-service firms providing either telephone or video service. This is because, by definition, the stand-alone costs of such single-service firms will add up to something exceeding the total joint costs of the MSPs.

#### *E. Industry Size and Economic Feasibility*

Given that economies of scope contribute toward a cost-minimizing structure of the MSP industry, the next question is: how many MSPs is that industry likely to have? Moreover, what determines that those MSPs will be financially viable (economically feasible) in the long run?

To answer the question about industry size, it is useful to seek insights from the economic theory of single-product firms. If all such firms in an industry adopt the same production techniques and face the same input prices, each firm will minimize its costs at a level of output known as the “minimum efficient scale” or MES. This is the level of production at which all economies of scale are exhausted. Then, if all firms are identical, the most efficient industry structure can support approximately the number of firms given by dividing the total demand served in the market by the MES. For example, if market demand for a service is 100,000 units and the MES is 200 units, then this industry will contain  $100,000 \div 200 = 500$  identical, cost-minimizing firms. Of course, this paradigm is oversimplified. Firms generally are not identical and even in competitive industries firms of unequal size coexist. This can still be consistent with a cost-minimizing industry structure if the different firm sizes reflect different MES levels which, in turn, reflect possibly different production techniques and practices.

However, determining the industry size this way is only half the story. For the firms in the efficient-sized industry to also be economically feasible, it is necessary for each firm to cover its costs and for market revenue as a whole to cover total industry costs. This introduces the demand side of the market - about which there is usually great uncertainty, especially in new or emerging industries. While it is possible to determine service price *floors* on the basis of cost

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using demand elasticities to set those markups (a principle called Ramsey pricing). If the firm is subject to price cap regulation, then other considerations will also apply.

information alone, it is usually *a priori* not known as to what the level of demand will be at prices at or above those price floors. Hence, until that level of demand is known, neither the industry size nor the prospects for economic feasibility of individual firms can be definitively predicted. The best “guess” that can be formed is that the larger the potential market demand relative to the MES (as determined by available production techniques), the larger will be the number of technically efficient and economically feasible firms in the industry.<sup>32</sup>

Generalizing these results to predict the number of multiproduct firms such as in an efficient and feasible MSP industry is quite challenging. There is one very important difference between a single-product firm that achieves the size dictated by its MES and a multiproduct firm. If the multiproduct firm experiences significant scope economies by combining different product lines, it may venture into a scale and scope of production that are well beyond what would be feasible in a single-product situation. This point can be illustrated by the following example.

Suppose there are two services *A* and *B*. If *A* and *B* are produced by separate firms on a stand-alone basis, assume the relevant costs are as follows:

<u>Service A</u>		<u>Service B</u>	
Stand-alone fixed cost	\$500	Stand-alone fixed cost	\$1000
Variable cost (at MES)	<u>\$100</u>	Variable cost (at MES)	<u>\$300</u>
Stand-alone total cost	\$600	Stand-alone total cost	\$1300

Combined industry total cost = \$1900

But, if *A* and *B* are produced together by the same firm *at their stand-alone levels*, assume the relevant costs are:

Shared fixed cost = \$400

<u>Service A</u>		<u>Service B</u>	
Service-specific fixed cost	\$100	Service-specific fixed cost	\$600
Variable cost	<u>\$100</u>	Variable cost	<u>\$300</u>
Service-specific incremental cost	\$200	Service-specific incremental cost	\$900

Total cost = \$1500

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<sup>32</sup>Baumol et al., *supra*, note 22, at 120.

First, note that the total cost at \$1500 is \$400 less than the combined industry total cost from stand-alone production, a manifestation of economies of scope because of \$400 in shared costs. When those costs are not shared (as in stand-alone production), the \$400 is included in the stand-alone fixed costs of *both A and B*.

Second, given that the MES is determined by the size of the *service-specific* fixed cost, under stand-alone production the MES is higher than under joint production. Put differently, because of lower service-specific fixed costs under joint production, any service-specific economies of *scale* are likely to be exhausted at lower levels of output than the MES levels under stand-alone production. Why would then the firm that produces *A* and *B* jointly attempt to produce the two services at the MES levels (and beyond) corresponding to stand-alone production? The answer is that the economies of scope from combined production are strong enough to more than overcome any service-specific *diseconomies* of scale incurred by pushing production of *A* and *B* to their stand-alone MES levels. The \$400 difference between the combined industry cost under stand-alone production and the total cost under joint production provides enough room for the firm to try this.

To summarize, the MES-based paradigm for predicting industry size that applies to single-product firms needs to be modified for multiproduct firms. Predicting the optimal number of firms in the efficient and feasible multiproduct industry is more complicated because the “average size” of the cost-minimizing firm in that industry depends on both the scale characteristics of the individual products and the scope economies that may exist among them. We may generalize, though, that the number of firms in the multiproduct industry will be larger as the level of demand for its products is greater *relative* to the cost-minimizing firm size. The important result is that economies of scope can induce multiproduct firms like MSPs to provide services (both their range and levels) that would not be warranted by service-specific scale factors alone. From that standpoint, any public policy that encourages the growth of an MSP industry based on economies of scope will prove ultimately beneficial to consumers and society at large.

#### *F. Incentives for Multiproduct Production*

As stated above, economies of scope are an important reason for firms to be

multiproduct. However, while economies of scope contribute importantly and uniquely to the formation of multiproduct firms, they are not the only possible explanation.

When a firm faces price and/or production uncertainty, and the associated risk gives rise to real costs, any risk reduction through diversification into multiple products brings a cost saving.<sup>33</sup> Leland Johnson suggests that diversification is an important motive behind LECs' seeking to enter the market for video services.<sup>34</sup> According to this reasoning, slower growth or diminishing economies of scale in and greater competition for an LEC's core telephone business may prompt it to seek other sources of revenue. Johnson believes that LECs' particular interest in the video business is prompted by the 14 percent compounded annual growth in cable industry revenues between 1987 and 1992.<sup>35</sup>

However, even cost savings from diversification can be viewed as a form of economy of scope. Consider the following example. Suppose again that a firm is providing two services, *A* and *B*. Also, suppose that the riskiness of *A* (as measured perhaps by the variance of the distribution of revenues or returns from *A*) is inherently greater than that of *B*. This may happen because *A* is subject to more competition and/or to greater seasonal or cyclical market demand fluctuations than *B*.<sup>36</sup> Accordingly, the true cost of capital (related to riskiness) is also higher for *A*. Integrated production of the two services within a single firm may *both* reduce the inherent riskiness of *A* and spread out the remaining risk over a larger pool of revenues. The cost of capital for the integrated firm may well be *below* the weighted average cost of capital from the separate markets for *A* and *B*. If this happens, the lower combined capital cost is another manifestation of the economies of scope.

Another explanation for the existence of multiproduct firms comes from Teece (1982) who argues that although certain productive resources can be utilized for producing many

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<sup>33</sup>*Id.*, at 251 (n. 7).

<sup>34</sup> Johnson, *supra*, note 7, at 49-51.

<sup>35</sup>*Id.*, at 50. Johnson reports that cable industry revenues rose by 1992 to \$25 billion, which is between a quarter and a third of total LEC industry revenues.

<sup>36</sup>The demand for short and long-haul toll telephone calls are probably more volatile and seasonal than the demand for cable services.

different products, those resources may not always be easily moved among alternative uses.<sup>37</sup> For example, firm-specific or sunk resources are so specialized in use that the transaction costs involved in transferring them to uses outside the firm can be prohibitive. A firm anxious to avoid those transaction costs will often develop other lines of business so as to more fully utilize *internally* the firm-specific but multiple-use resources. It is easy to imagine this scenario being true of LECs that deploy broadband networks and many thousands of route-miles of optical fiber. Operating as an MSP (i.e., providing both telephony and video) that more fully utilizes the broadband network and the fiber investment makes good business sense from the standpoint of both economies of scope and transaction cost avoidance.

#### *G. Multiproduct Firms (MSPs) and Competition*

The *effects* of competition are ultimately a *performance* matter, but whether or not competition itself actually occurs as predicted does depend on *structural* conditions. Hence, the preceding discussion of industry structure issues is relevant to our discussion of competition among MSPs. Regarding the future MSP industry, the natural questions to ask are: (1) what effect will economies of scope have on competition? and (2) will such competition be efficient and sustainable? To answer these questions, we start with a series of results from economic theory. These results serve as general markers for the type of MSP industry that is likely to emerge under competition.

- (1) Economies of scope, together with the level of market demand, are important determinants of industry size, specifically the number of firms. However, whether the industry will be more or less concentrated (have fewer or more firms) also depends on the

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<sup>37</sup>D.J. Teece, "Towards an Economic Theory of the Multiproduct Firm," *Journal of Economic Behavior and Organization*, 4, 1982, 29-63. See also D. Levy and L.J. Haber, "An Advantage of the Multiproduct Firm: The Transferability of Firm-Specific Capital," *Journal of Economic Behavior and Organization*, 7, 1986, 291-302. Levy and Haber suggest that a multiproduct firm can transfer its firm-specific resources to their highest-valued use among its multiple product line. Over time, that firm can thereby minimize the cost of accumulating firm-specific resources. Fernandez-Cornejo et al. (1992) observe that this line of reasoning brings the Baumol et al. analytical framework in line with the transaction cost framework of Teece. See J. Fernandez-Cornejo, C.M. Gempesaw II, J.G. Elterich, and S.E. Stefanou, "Dynamic Measures of Scope and Scale Economies: An Application to German Agriculture," *American Journal of Agricultural Economics*, May 1992, 329-342.

degree of substitutability among the various products of that industry. Generally, there will be fewer firms in the industry as economies of scope are *greater* and the level of substitutability among the products is *lower*; but, these firms are more likely to be multiproduct. Such attributes appear to describe the MSP industry quite well. However, this does not necessarily mean that that industry will evolve into a natural monopoly, only that a "large" number of competitors should not be expected. The tradeoff is between greater efficiency and lower costs and prices, on the one hand, and competition among a few, on the other. Conversely, when economies of scope are *lower* and the level of substitutability *greater*, there is a greater likelihood of specialization, i.e., single-product firms, and a larger number of firms.<sup>38</sup>

- (2) Economies of scope are both necessary and sufficient for competitive multiproduct firms to exist.<sup>39</sup> In competitive equilibrium, by definition, all firms and the industry as a whole are operating at their most efficient level. In the absence of economies of scope, it would be cheaper for firms to specialize, i.e., to be single-product firms. Multiproduct firms would only exist in competitive equilibrium if economies of scope made them more efficient relative to single-product firms. Conversely, if despite economies of scope, only single-product firms were to operate, then the industry could not be at its most efficient level or in competitive equilibrium.
- (3) The previous result, however, does *not* mean that the competitive multiproduct firms must *all* be producing *every* product in that industry. In fact, it is possible for an efficient industry with multiproduct firms to include some single-product firms as well. There are some industry circumstances in which the industry *as a whole* minimizes total cost but certain member firms find their economies of scope offset by certain transaction costs and, therefore, find specialization to be a lower-cost strategy.<sup>40</sup> In the MSP industry, there may well be an LEC and a cable company that both offer telephony and video coexisting with other firms that specialize in either telephony or video. This scenario is conceivable when there are many alternative technologies for delivering service (broadband, narrowband with ADSL, direct broadcast satellite, etc.) and there are unwelcome transaction costs facing a firm (legal restrictions, engineering or technical incompatibilities) that cause it to specialize in one service. The tendency for multiproduct and single-product firms to coexist in competitive equilibrium despite industry-wide scope economies will be more pronounced in the MSP industry the more varied are the backgrounds and production techniques of the competitors (e.g., LECs, cable companies, IXC's, wireless companies, other media companies, etc.).

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<sup>38</sup>These and similar results have been reported by G. De Fraja, "Product Line Competition and Market Structure," *Economic Notes*, 21, 1992, 511-525, and N. Economides, "The Incentive for Vertical Integration," EC-94-05, Stern School of Business, New York, 1994.

<sup>39</sup>Baumol et al., *supra*, note 22, at 248-249.

<sup>40</sup>*Id.*, at 249-250, for an example.

### *H. Contestability: A Better Standard Than "Perfect Competition"*

The conventional textbook concept of (perfect) competition has for many decades served as a convenient yardstick for judging the structure, conduct, and performance of particular industries. However, that yardstick is not well-suited to the task of evaluating industries (like the MSP industry) in which economies of scale and scope are a prominent feature. The economic theory results above show that because of economies of scope and multiproduct production it is unlikely that the number of "competitive" firms will be "large." Yet, a fundamental tenet of competition is that the industry be composed of a large number of firms in which no firm, by itself, can exert any influence on the market price. Competition theory is also largely silent on how competition should be judged in multiproduct industries in which the different product lines may face quite different demand conditions and in which demand is not sufficient to support more than a small number of multiproduct firms.

In recent years, the standard of *contestability* has become increasingly prominent as a replacement for the standard of perfect competition.<sup>41</sup> This standard has none of the onerous requirements of perfect competition theory (e.g., it does not require "large" numbers of firms, homogeneous products, or perfect information). Instead, it provides relatively simple - and testable - principles which accord with a reasonable view of what competition ought to be like, particularly in industries with scale and/or scope economies.

A *perfectly contestable market* is fully accessible to potential entrants and has two major properties: (1) potential entrants, irrespective of their size at entry relative to incumbents, can serve the same market demands and use the same production techniques as the incumbents; and (2) potential entrants can reasonably expect to sell as much of their products as they want if they undercut the incumbents' prices. In this market, relatively costless entry and exit are possible (it

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<sup>41</sup>Some of the earliest formulations of contestability theory are in R.D. Willig, "What Can Markets Control?" in R. Sherman (ed.), *Perspectives on Postal Service Issues*, American Enterprise Institute, 1980, and W.J. Baumol and R.D. Willig, "Fixed Cost, Sunk Cost, Entry Barriers and Sustainability of Monopoly," *Quarterly Journal of Economics*, 95, 1981, 405-431. The most complete treatise on contestability is undoubtedly Baumol et al. (1988), *supra*, note 22 (first edition published in 1982). Critiques include W.G. Shepherd, "'Contestability' vs. Competition," *American Economic Review*, 74, 1984, 572-587, and M.L. Weitzman, "Contestable Markets: An Uprising in the Theory of Industry Structure: Comment," *American Economic Review*, 73, 1983, 486-487. Baumol et al. (1988, Ch 17) report on various empirical studies and tests of contestability in different industries.

is sufficient that sunk costs are minimal). This promotes “hit-and-run” entry in that any time incumbents earn “excessive” profits, new entrants can quickly and easily enter the market, underprice the incumbents, siphon off some of their excess profits, and, if need be, exit at little or no cost.

The contestability standard is attractive because it does *not* require that a competitive industry must have a large number of firms. In fact, the very *potential* for hit-and-run competition exerts a strong disciplining influence on incumbent firms even though they may be few in number and command very large market shares. Therefore, in a contestable market, large market shares are *not* an indicator of market power or a harbinger of excessive profits. So even in industries for which the efficient industry structure is one with few competing multiproduct firms, contestability can assure that those firms make only reasonable profits, do not exert market power, and do not harm consumer welfare. These are all benefits that perfect competition is supposed to deliver; contestability can do so in real-world markets without having to satisfy the onerous requirements mentioned above.

The key to a contestable market is, of course, free entry and exit. Prominent barriers to entry include high sunk costs and strategic or predatory pricing by incumbents. Therefore, a market can be rendered contestable, despite the presence of “few” firms in it, by simply mitigating those entry barriers. In Chapter III we considered briefly the range of public policy measures that are appropriate for fostering contestability (and competitive outcomes) in the MSP industry.

### *I. The Empirical Record on Economies of Scope in Telecommunications*

We next review the empirical record on the phenomenon of economies of scope. Despite the fact that empirical tests for scope economies have been carried out for a variety of industries, there is a relatively small and patchy record of such tests for the telecommunications industry. We are aware of only one original econometric study of the economies of scope from combining telephony and video (Levin and Meisel, 1992).<sup>42</sup> Two other studies (Goodman et al., 1993; and

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<sup>42</sup>S.L. Levin and J.B. Meisel, “Telephone Company Ownership of Rural Cable Television Companies,” *Review of Industrial Organization*, 8, 1992, 465-472.

Stolleman, 1993) also establish economies of scope in integrated broadband networks by suitably modifying earlier studies of LEC entry into the cable or CATV industry.<sup>43</sup>

Levin and Meisel find that in rural communities cable companies owned by telephone companies are able to supply basic cable service at a lower price (by approximately \$1.20 per month or 8 percent) than comparable cable companies not owned by telephone companies. Their tests reveal that this is due to economies of scope rather than any anticompetitive practices or cross-subsidies. Levin and Meisel speculate that the economies of scope may arise from shared resources like integrated billing, marketing, and customer contact. They consider and rule out the possibility of cost-shifting by the combined firms from their cable operations to their regulated telephone businesses.

Stolleman conducts a welfare analysis of three alternative supply configurations: an integrated LEC broadband network, an integrated LEC network with price cap regulation of its narrowband services, and a fragmented system with stand-alone firms for narrowband services and CATV respectively. He finds the integrated network to be able to deliver combined narrowband and video services for \$39 a month per subscriber, well below the \$63 per month for the fragmented system and slightly below the \$44 for the LEC network under price caps. He also finds that both integrated LEC network options deliver about \$10 more in consumer surplus (a measure of consumer welfare) than does the fragmented system. Stolleman's analysis is based on data generated by engineering studies at the Carnegie-Mellon University.<sup>44</sup>

Goodman *et al.* investigate and confirm the presence of economies of scope in an integrated broadband network that is based on fiber-to-the-curb architecture. This study refutes an earlier study claiming that *diseconomies* of scope exist in that network, though with fiber-to-the-home architecture.<sup>45</sup>

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<sup>43</sup>See references, *supra*, note 7.

<sup>44</sup>Reed and Sirbu, *supra*, note 7.

<sup>45</sup>Johnson and Reed, *supra*, note 7. Also see the discussion of the comparative merits and drawbacks of fiber-to-the-neighborhood and fiber-to-the-curb architectures in Johnson (1994), *supra*, note 7, Ch 3. For example, Johnson cites a study by D.P. Reed which claims that the stand-alone costs for telephony and cable are about \$690 and \$1000 per subscriber, respectively. Also, the investment for fiber-to-the curb is estimated at \$2,000 per subscriber but that for fiber-to-the-neighborhood is much less

Evidence of economies of scope among other categories of telephone service (e.g., local and long distance services, switched and private line services) has been presented in other studies. Table 1 presents a quick summary of these studies and their findings.

Estimating and testing for economies of scope is a complex exercise. The most elaborate and sophisticated of tests rely on derived properties of estimated multiproduct cost functions. Often, we may observe stand-alone costs but not have much data on costs of yet-to-be-deployed integrated networks. In contrast to the more meaningful econometric approach (since, being based on actual historical data, this approach accounts for both planned and unplanned costs), the paucity of data often forces us to rely on engineering cost studies. These provide network cost in idealized, best-practice scenarios that usually do not correspond to real-world operations. Stolleman's modifications of data generated from such engineering analyses are a case in point. Nevertheless, as integrated broadband networks get deployed and more history with such networks accumulates, the opportunities will increase for sharper and repeated testing of the economies of scope phenomenon.

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at \$1,410 per subscriber. Johnson concludes from these numbers that while there are scope diseconomies with the fiber-to-the-curb approach, there are scope economies with the fiber-to-the-neighborhood approach. He attributes the cost savings from the latter to the sharing of costly electronic equipment and backup power supplies by a larger number of subscribers. Interestingly enough, a recent study released by Morgan Stanley & Co. estimates that for a cable company seeking entry into wireline telephony, a fiber-to-the-node deployment will cost only \$875-900 per subscriber, seven years after entry and with a 15.5 percent penetration. See Bilotti (1994), *supra*, note 7.

**Table 1. Findings About Economies of Scope in The Telecommunications Industry<sup>46</sup>**

Study	Firm	Years of Study	Type of Cost Model	Services	Economies of Scope
Diewert & Wales (1991)	AT&T	1947-77	Normalized Quadratic	Local, Toll	Yes
Diewert & Wales (1991)	U.S. Telephone Industry	1951-87	Normalized Quadratic	Local, Toll	Yes
Diewert & Wales (1991)	NTT (Japan)	1958-87	Normalized Quadratic	Local, Toll	Yes
Gabel & Kennet (1994)	Simulated for mid-size city	No historical data	Engineering Optimization	Switched Local and Toll, Private Line Local and Toll	Yes
Gentzoglanis (1988)	Bell Canada	1952-86	Translog	Local, Toll	Yes
Gentzoglanis (1988)	AGT	1974-85	Translog	Local, Toll	Yes
Kiss, Karabadjian, & Lefebvre (1983)	Bell Canada	1952-78	Generalized Translog	Local, Toll	Yes
Röller (1990)	AT&T	1947-79	CES-Quadratic	Local, Toll	Yes
Röller (1990)	AT&T	1947-79	CES-Quadratic	Local, IntraLATA Toll, InterLATA Toll	Yes
Shin & Ying (1992)	Panel of U.S. LECs	1976-83	Translog	Access Lines, Local, Toll	No

[In Table 1, "Toll" refers to Long Distance service]

<sup>46</sup>See Section J of this Appendix for citations.

*J. Studies of Economies of Scope in Telecommunications*

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**Building a Better Video Mousetrap**

**By**

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**April 5, 1995**

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